AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1 - 35. (canceled)

36. (currently amended) A method of assessing the change of cartilage in a joint of a living subject over time, the method comprising the steps of

(a) determining the thickness, width, area or volume of a region of cartilage at an initial time T_1;

(b) determining the thickness, width, area or volume of the region of cartilage at a later time T_2;

(c) determining the change in the thickness, width, area or volume of the cartilage between the initial and later times, wherein the change in thickness is determined, in part, by alignment using 3-D registration techniques;

(d) ~~electronically~~ transferring an electronically generated image comprising the cartilage from a transferring device to a receiving device located distant from the transferring device;

(e) receiving the transferred image at the distant location; and

(f) converting the transferred image to a degeneration pattern.

37. (currently amended) A method of assessing the change of cartilage in a joint of a human over time, the method comprising the steps of

(g) determining the thickness, width, area or volume of a region of cartilage at an initial time T_1;

(h) determining the thickness, width, area or volume of the region of cartilage at a later time T_2;

(i) determining the change in the thickness, width, area or volume of the cartilage between the initial and later times;

(j) electronically transferring an electronically generated image comprising the cartilage from a transferring device to a receiving device located distant from the transferring device;

(k) receiving the transferred image at the distant location;

(l) converting the transferred image to a degeneration pattern; and

~~The method of claim 36, wherein the joint is from a human and wherein the method further comprises the step of~~

(m) generating a movement pattern for the joint of the human from a database accessible to the distant location, wherein the database includes a collection of movement patterns of human joints, which patterns are organized and are accessed by reference to characteristics such as type of joint, gender, age, height, weight, bone size, type of movement, and distance of movement.

38. (previously presented) The method of claim 37, wherein the movement pattern is of a human walking, running, stair-climbing, stepping onto/off of a platform, or jumping.

39. (previously presented) The method of claim 37, wherein the movement pattern and the electronically generated image are merged to show how the movement pattern interacts with the electronically generated image.

40. (currently amended) A method of assessing the change of cartilage in a joint of a mammal over time, the method comprising the steps of:

(a) determining the thickness, width, area or volume of a region of cartilage at an initial time T_1;

(b) determining the thickness, width, area or volume of the region of cartilage at a later time T_2;

(c) determining the change in the thickness, width, area or volume of the cartilage between the initial and later times;

(d) electronically transferring an electronically generated image comprising the cartilage from a transferring device to a receiving device located distant from the transferring device;

(e) receiving the transferred image at the distant location;

(f) converting the transferred image to a degeneration pattern,

~~The method of claim 36,~~ wherein the volume of the cartilage loss is assessed by

determining the thickness, D_N, of the normal cartilage near a cartilage defect;

obtaining the thickness of the cartilage defect, D_D, of the region;

subtracting D_D from D_N to give the thickness of the cartilage loss, D_L;

determining the area of the cartilage defect A_D; and

multiplying the D_L value times the area of the cartilage defect, A_D, to give the volume of cartilage loss.

41. (previously presented) The method of claim 40, wherein the region of the cartilage defect includes a portion of the cartilage contiguous to the defect.

42. (previously presented) The method of claim 36, wherein the joint is a knee joint.

43. (previously presented) The method of claim 36, wherein the subject is a human.

44. (canceled)

45. (currently amended) A method of assessing the change of cartilage in a joint of a subject over time, the method comprising the steps of:

(a) determining the thickness, width, area or volume of a region of cartilage comprising

normal and diseased cartilage at an initial time T_1 using a magnetic resonance imaging (MRI) technique;

(b) determining thickness, width, area or volume of the region of cartilage at a later time T_2 using a magnetic resonance imaging (MRI) technique; ~~and~~

(c) determining the change in the thickness, width, area or volume of the cartilage between the initial and later times~~,~~; and

(d) performing a gait analysis, wherein the MRI technique and gait analysis includes placing external markers on the skin overlaying the bone on either side of the joint, the markers used to correlate morphological and biomechanical data.

46. (previously presented) The method of claim 45, wherein the MRI technique first obtains a series of two-dimensional views of the joint, which are then mathematically integrated to give a three-dimensional image.

47. (previously presented) The method of claim 45, wherein the MRI technique employs a gradient echo, spin echo, fast-spin echo, driven equilibrium fourier transform, spoiled gradient echo or steady state free precession technique.

48. (canceled)

49. (previously presented): A method of making a three-dimensional map of joint cartilage in a subject, wherein the joint comprises cartilage and associated bones on either side of the joint, which method comprises

measuring a detectable biochemical component selected from the group consisting of glycosaminoglycan, sodium, water and hyaluronic acid;

determining the relative amounts of the biochemical component;

mapping the amounts of the biochemical component in three dimensions; and

determining the areas of abnormal joint cartilage by identifying the areas having altered amounts of the biochemical component present, thereby making a three-dimensional map of joint cartilage.

50. (canceled)

51. (previously presented) The method of claim 49, wherein the joint is a knee joint.

52. (previously presented) The method of claim 51, wherein the subject is a human.

53. (canceled)

54. (previously presented) The method of claim 49, wherein measuring of the biochemical component is done using a magnetic resonance imaging (MRI) technique that includes placing external markers on the skin overlaying the bone on either side of the joint.

55. (previously presented) The method of claim 54, wherein the MRI technique first obtains a series of two-dimensional views of the joint, which are then mathematically integrated to give a three-dimensional image.

56. (previously presented) The method of claim 55, wherein the MRI technique employs a gradient echo, spin echo, fast-spin echo, driven equilibrium Fourier transform, spoiled gradient echo or steady state free precession technique.

57. (currently amended) A method of estimating the change of cartilage in a joint, wherein

the joint comprises articular cartilage, the method comprising the steps of

(a) defining a 3D object coordinate system of the joint at an initial time, T_1;

(b) identifying a region of a cartilage defect or diseased cartilage within the 3D object coordinate system;

(c) defining a volume of interest around the region of the cartilage defect or diseased cartilage whereby the volume of interest is equal to or larger than the region of cartilage defect or diseased cartilage, but does not encompass the entire articular cartilage;

(d) defining the 3D object coordinate system of the joint at a second timepoint, T_2;

(e) placing the identically-sized volume of interest into the 3D object coordinate system at timepoint T_2 using the object coordinates of the volume of interest at timepoint T_1; and

(f) computing ~~measuring~~ any differences in cartilage within the volume of interest between timepoints T_1 and T_2 due to the cartilage defect or diseased cartilage.

58. (previously presented) The method of claim 57, wherein the joint is a knee joint.

59. (previously presented) The method of claim 57, wherein the subject is a human.

60. (previously presented) The method of claim 57, wherein measuring the differences shows a loss of the cartilage between T_1 and T_2.

61. (previously presented): The method of claim 36, wherein steps (a) and (b) comprise determining thickness and step (c) comprises determining the change in thickness.

62. (previously presented): The method of claim 36, wherein steps (a) and (b) comprise determining width and step (c) comprises determining the change in width.

63. (previously presented) The method of claim 36, wherein steps (a) and (b) comprise determining area and step (c) comprises determining the change in area.

64. (previously presented) The method of claim 36, wherein steps (a) and (b) comprise determining volume and step (c) comprises determining the change in volume.

65. (previously presented) The method of claim 45, wherein steps (a) and (b) comprise determining thickness and step (c) comprises determining the change in thickness.

66. (previously presented) The method of claim 45, wherein steps (a) and (b) comprise determining width and step (c) comprises determining the change in width.

67. (previously presented) The method of claim 45, wherein steps (a) and (b) comprise determining area and step (c) comprises determining the change in area.

68. (previously presented) The method of claim 45, wherein steps (a) and (b) comprise determining volume and step (c) comprises determining the change in volume.

69. (New) A method of treating a human with a joint disease involving cartilage, the method comprising:

obtaining an electronic image of a joint, wherein said image includes both normal and diseased cartilage tissue;

electronically evaluating said image to obtain information comprising at least one of volume, area, thickness, shape, curvature, geometry, biochemical contents, signal intensity and relaxation time of said normal and/or diseased tissue; and

determining biomechanical data associated with the joint.

70. (New) The method of claim 69, wherein biomechanical data includes static loading alignment.

71. (New) The method of claim 69, wherein biomechanical data includes alignment during joint motion.

72. (New) The method of claim 69, wherein biomechanical data includes alignment during gait.

73. (New) The method of claim 69, wherein determining biomechanical data includes determining at least one axis associated with the joint.

74. (New) The method of claim 69, wherein the at least one axis is associated with a femoral condyle coordinate system and includes one of a medial-lateral axis, an inferior-superior axis, and an anterior–posterior axis.

75. (New) The method of claim 69, wherein the at least one axis is associated with a tibial coordinate system and includes one of a medial-lateral axis, an inferior-superior axis, and an anterior–posterior axis.

76. (New) The method of claim 69, further comprising simultaneous displaying said information and biomechanical data.

77. (New) The method of claim 69, further comprising providing a therapy based on said information and biomechanical data.

78. (New) The method of claim 74, wherein said therapy includes using said information and biomechanical data to shape an implant.